



# **ARMY NET ZERO PROVE OUT**

## **Final Integrated Net Zero Best Practices**

**November 18, 2014**

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## TABLE OF CONTENTS

	Page
<b>LIST OF ACRONYMS AND ABBREVIATIONS .....</b>	<b>ii</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>iii</b>

## LIST OF APPENDICES

Appendix A:	Integrated Net Zero Best Practices Brochure
Appendix B:	Text version of the Integrated Net Zero Best Practices Brochure

## LIST OF ACRONYMS AND ABBREVIATIONS

ACOM	Army Command
CERL	Construction Engineering Research Laboratory
CTC	Concurrent Technologies Corporation
DoD	Department of Defense
DOE	Department of Energy
DPW	Directorate of Public Works
DRU	Direct Reporting Unit
EMS	Environmental Management System
EO	Executive Order
ECIP	Energy Conservation and Investment Program
ESCO	Energy Services Company
ESPC	Energy Saving Performance Contracts
ESTCP	Environmental Security Technology Certification Program
HQDA	Headquarters, Department of the Army
LEED	Leadership in Energy & Environmental Design
MILCON	Military Construction
NDCEE	National Defense Center for Energy and Environment
NZ	Net Zero
ODASA(E&S)	Office of the Deputy Assistant Secretary of the Army for Energy & Sustainability
OSD	Office of the Deputy Under Secretary of Defense
PBC	Performance-Based Contracting
SIR	Savings to Investment Ratio
SRM	Sustainment, Restoration and Modernization
USACE	United States Army Corps of Engineers



## EXECUTIVE SUMMARY

In support of Task No. 0818, “Army Net Zero Prove-Out,” the National Defense Center for Energy and Environment (NDCEE), operated by Concurrent Technologies Corporation (CTC), was tasked to provide the Office of the Deputy Assistant Secretary of the Army for Energy & Sustainability (ODASA[E&S]) written summaries of significant, demonstrated Integrated Net Zero best practices that can be used to guide Army installations in their pursuit of Net Zero and facilitate the institutionalization of Net Zero across the Army enterprise.

On April 19, 2011, the Assistant Secretary of the Army for Installations, Energy and Environment, the Honorable Katherine Hammack announced the sites for the Army Net Zero Pilot Installation Initiative – two (2) of which were selected as Integrated Pilots:

- Fort Carson, Colorado
- Fort Bliss, Texas

These sites served as test beds for the Army’s Net Zero Initiative and the Army provided technical support to the Pilots with the intent to transition and institutionalize Net Zero concepts, responsibility, methods, and implementation activities from the pilot installations to the appropriate Army Commands (ACOMs)/Direct Reporting Units (DRUs) and all Army installations. The purpose of this task was to support that transition by documenting Integrated Net Zero best practices identified that can be shared with other Army installations and advance the Net Zero concept across the Army.

Net Zero builds on longstanding sustainable practices and incorporates emerging best practices in building and community management of energy, water and solid waste at Army installations. With the 28 January 2014 issuance of the Army Net Zero Installation Directive, it became Army policy that all installations will implement Net Zero to the maximum extent practical and fiscally prudent.

The Integrated Net Zero Best Practices brochure (Appendix A) and a text version of the brochure (Appendix B) developed for this task captures significant, demonstrated best practices at the Integrated Net Zero pilot installations. Previous experience from NDCEE Task 0755, ongoing collaboration calls, and Net Zero meeting support was leveraged to capture achievements of the pilot installations, identify those projects that can be replicated at other installations and help the transition of the Net Zero Pilot Installation Initiative concepts to a wider Army audience.

## **APPENDIX A**

### **Integrated Net Zero Best Practices Brochure**



integrated\_Net Zero  
Brochure\_13NOV2014

# Army Net Zero Best Practices

## Energy · Water · Waste







# Energy • Water • Waste

A Net Zero Installation applies an integrated approach to the management of energy, water, and waste to capture and commercialize the resource value and/or enhance the ecological productivity of land, water, and air. A Net Zero Installation has three interrelated components: Net Zero Energy, Net Zero Water, and Net Zero Waste.

## THE ARMY'S NET ZERO INITIATIVE:

Net Zero is a strategy for sustainably managing energy, water, and solid waste programs on Army installations in a way that ensures the Army of tomorrow has the same access to energy, water, land and natural resources as today's Army. Net Zero installations will reduce energy and water usage and solid waste generation, exceeding goals set by Executive Orders, Department of Defense (DoD) Directives and Army Policies, where fiscally responsible. The journey towards Net Zero will provide greater energy and water security and increase operational flexibility.

## Introduction

To date, the Army has made substantial progress in the areas of Net Zero Energy, Water, and Waste. A number of federal mandates, rising fuel costs, over-reliance on fragile commercial power grids, aging water and wastewater distribution systems coupled with the risk of compliance penalties have challenged the Army to step up and lead by example with its Net Zero Initiative. The Army rose to this challenge with the Net Zero Pilot Installation Initiative, which has allowed the Army to identify best practices and lessons learned that can be used to guide all installations in achieving Net Zero goals mandated through Executive Orders, DoD Directives and Army Policies. Capturing lessons learned and incorporating best practices in installation operations and management is a crucial step in institutionalizing Net Zero across the Army enterprise. This document summarizes best practices that simultaneously address Net Zero Energy, Water and Waste objectives. Best practices are organized into three main areas: **1)** Management Strategies; **2)** Outreach Education and Awareness; and, **3)** Existing Programs and Funds. While this document is specific to integrated efforts, some of the listed best practices are programs, policies, and strategies that can also be applied to Net Zero Energy, Water, and Waste.

## Management Strategies

Best Practices in terms of management strategies involve effectively integrating Net Zero concepts into existing processes such as master planning, military construction, residential housing, medical services, recreation, training, installation management of operations and maintenance and support contracts for recycling and refuse removal, and energy and water utility infrastructure support and services. New management strategies may begin as pilots until the cost effectiveness and positive Net Zero impact has been proven. Integrated management strategies require close collaboration amongst installation management personnel.

**Integration with existing energy, water and waste management efforts** – Integration across resource areas allows for greater efficiency, fewer repeated or duplicate efforts and more of the desired outcomes as programs with overlapping mandates are used to support each other, rather than pursued independently and isolated from each other. The underlying principle for Net Zero is to enhance existing programs and policies, not to create new requirements. Therefore, an integrated Net Zero management strategy would leverage Net Zero goals and objectives to support existing energy efficiency, water conservation, and waste reduction efforts. An example is installations that have incorporated the language and goals of Net Zero into their existing sustainability goals and objectives. Net Zero can also be used to support existing Environmental Management System (EMS) goals.

**Integration with existing plans** – There are multiple planning requirements at installations such as the Master Plan, Capital Improvement Plan, Integrated Natural Resource Management Plan, Water Management Plan, and Emergency Response Plan. Net Zero concepts and actions should be incorporated into these existing planning processes. For instance, capital improvements should require upgrades to water lines to reduce leakage. Renovations to buildings should include higher insulation values, new meters, lower water and energy using fixtures, and other improvements that assist with Net Zero goal achievement. Net Zero actions should support energy and water security through integration with emergency response planning.





# Army Net Zero Best Practices

**Integrated Net Zero action planning** – Installations working towards Net Zero in all three areas need to synthesize the planned actions in Net Zero Energy, Water and Waste to enable improved decision-making. Benefits of an Integrated Net Zero action plan include enhanced interaction of installation personnel that have separate focus areas for energy, water, and waste. Integrated planning helps these decision makers view the entire scope of Net Zero; which is not possible with independent efforts. Another benefit is that decision makers are able to more effectively evaluate the strengths and weaknesses of a particular action. The integrated approach also allows identification and recognition of actions which are necessary predecessors to others and critical to later success. An Integrated Net Zero plan enables management personnel to realize a focus on projects must be balanced with a focus on planning, policy, and programming.

**Improved Space Management of Real Property** – Best practices in the form of space management have been identified that can have a positive impact on reducing energy and water use and minimizing waste generation. These include increased monitoring of building space, consolidating activities into smaller spaces, and implementing cost-effective closure of vacant buildings. Efficient space management will lower heating and cooling costs as vacant or partially-filled spaces are not being heated and cooled unnecessarily, and positively impacts more than one area of Net Zero.

**Leadership in Energy & Environmental Design (LEED)** – The United States Green Building Council's LEED is an evaluation criteria program that helps to drive sustainable design and development. Installations can pursue energy, water and waste credits through implementation of this program for new construction and major renovations. Designing buildings using LEED helps to reduce energy and water use throughout the life cycle of the building by installing more efficient equipment from the onset. Reused or recycled materials are also part of the LEED credit system, making LEED an effective management strategy for all areas of Net Zero.

**Performance-Based Contracts (PBC)** – A common challenge Army installations face in meeting their Net Zero goals is that many of their operations and services are contracted. Specific performance goals related to Net Zero may not be a requirement of those contracts, thus making it more challenging to reach the goals. PBCs were originally put in place in the 1990s to improve Army remediation efforts as estimates to complete clean-up projects kept increasing every year

while milestones were only met 70% of the time – or less. By 2004 the use of PBCs was credited for over \$215M in cost avoidance and project completion surpassed projections. Applying PBCs to installation operations and services is a best practice that will reduce contract oversight, lower the risk of increased costs, and will incentivize innovative and cost-effective strategies to help the Army meet Net Zero goals. This is in line with all Net Zero hierarchies in that it fosters a culture change.

## Outreach, Education and Awareness

Outreach, education and awareness efforts can be powerful approaches to achieving Net Zero. Awareness of Net Zero goals is critical so that members of the installation community will not only know that they need to handle and dispose of materials differently and make different choices about the energy and water they consume, but how to take action. Outreach, education and awareness are often low cost Net Zero best practices that may be overlooked, but can often have significant impact or may be essential to support the success of other Net Zero efforts.

Examples of outreach, education and awareness best practices are as follows:

**Participation in Design Charrettes** – Outreach efforts that involve Net Zero or sustainability staff participation in design or planning charrettes raises awareness of Net Zero. Facility design impacts Net Zero goals throughout the life cycle of that facility, therefore engagement with the design team early on helps to ensure improvements that reduce energy and water use are incorporated from the beginning.

**Awareness using Conventional Media** – Multiple approaches can be leveraged to increase awareness. Public Service Announcements developed by the Army or other installations can be leveraged. Signage for installation facilities can be implemented. Net Zero Initiative web sites should be set up, or installations can leverage existing sustainability or environmental web sites. Articles for installation newspapers or community newspapers should be submitted to cover Net Zero activities.

**Awareness using Social Media** – Installations can get the word out using social media, as well. Examples include Net Zero Initiative Facebook pages and implementing campaigns to get installation community to “like” the page. Installation Twitter accounts can also be leveraged to provide “tweets” regarding the Net Zero Initiative.

**Education and Outreach through Attending and Hosting Conferences** – National conferences provide educational opportunities. Attending regional conferences may support outreach to organizations and service providers for new partnerships, as well as education about regional approaches. Hosting local conferences will support outreach to community members and organizations to build engagement and partnerships for installation programs.

**Outreach and Education through Sharing with Other Installations, Commands, and Headquarters Department of the Army (HQDA)** – The pilot installation initiative has shown that sharing approaches with other installations and challenges with HQDA can be very valuable in identifying new initiatives and troubleshooting implementation issues. Some interactions lead to immediate results, while others help build a collective education on complex issues and the eventual resolution of the issues.

**Net Zero Event Demonstration** – Installations have successfully demonstrated Net Zero best practices at large installation community events (e.g. concerts and garrison picnics). The large-scale events provide opportunities to demonstrate best practices and achieve significant awareness and education.

**Contests and Awards** – Resource use reduction contests are effective ways of enabling success. While resource reduction is driven by goals and mandates, the spirit of competition is a powerful tool to accomplish Net Zero. Individual awards for outstanding program support are also successful motivators.







# Energy · Water · Waste

## Existing Programs and Funds

Implementation of Net Zero best practices using existing programs and funds should be a priority, as this approach will enhance or add focus to programs already in place. These efforts may replace others that are having less overall impact on achieving Net Zero goals, they can engage stakeholders and community members, and can help to build momentum for additional Net Zero initiatives. Installations will be most successful in accessing existing programs and funds when they can show that Net Zero projects can lead to efficiencies, cost savings, support mission impact, and use these positive outcomes to develop a bias for innovation and increased momentum for achieving Net Zero goals. Examples of existing programs and funding mechanisms include:

**Sustainment, Restoration and Modernization (SRM) Funds** – SRM funds are applied annually to update and improve existing infrastructure through projects developed and prioritized by the installation DPW. Targeting infrastructure upgrades that will enable Net Zero goals is an effective strategy to meet multiple goals at once.

**Energy Saving Performance Contracts (ESPC)** – Through the ESPC, installations can partner with an Energy Services Company (ESCO) wherein the ESCO conducts an energy audit and then identifies and implements energy savings improvements with no up-front costs required by the installations. Payment to the ESCO is based on the energy savings over time.

Existing ESPCs may be used for water conservation projects, as saving water also saves energy, making this an effective strategy for addressing more than one Net Zero area at a time.

**DoD's Energy Conservation Investment (ECIP) Program** – ECIP is part of the Military Construction (MILCON) program and is designated for projects that save energy or reduce energy costs. Funding is awarded by the Office of the Deputy Under Secretary of Defense (OSD) on a by-project basis and awards are allocated based on a combination of the highest savings to investment ratio (SIR) and the priorities emphasized by the Energy Policy Act of 2005, Executive Order (EO) 13423, and the Energy Independence and Security Act of 2007. This funding is an important existing program that can be leveraged in support of Net Zero Energy and Water as saving water also saves energy.

**Environmental Security Technology Certification Program (ESTCP)** – Army installations have various opportunities for funding technology demonstration and validation projects. The ESTCP is one of these. Other potential research partners include the Environmental Protection Agency, the United States Army Corps of Engineers (USACE) Construction Engineering Research Laboratory (CERL), the National Defense Center for Energy and Environment (NDCEE), or any of the Department of Energy (DOE) National Labs.







The Net Zero program pushes the Army to go beyond meeting basic environmental mandates and goals in favor of more comprehensive efforts. The program saves taxpayer money, especially in times of fiscal challenges, uses resources more wisely and efficiently, and reduces the Army's impact on the environment.

– Honorable Katherine Hammack

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## Resources

ASA (IE&E) home page:  
[www.army.mil/asaiee](http://www.army.mil/asaiee)

Energy and Sustainability Webpage:  
[www.asaie.army.mil/Public/ES](http://www.asaie.army.mil/Public/ES)

Army Energy Program Net Zero Vision:  
<http://www.asaie.army.mil/Public/ES/netzero/index.html>



## **APPENDIX B**

### **Text Version of the Integrated Net Zero Best Practices Brochure**



Integrated  
Text.docx



## **Army Integrated Net Zero Best Practices**

### **Net Zero Installation**

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Back Cover Quote:

*The Net Zero program pushes the Army to go beyond meeting basic environmental mandates and goals in favor of more comprehensive efforts. The program saves taxpayer money, especially in times of fiscal challenges, uses resources more wisely and efficiently, and reduces the Army's impact on the environment.* Honorable Katherine Hammack